

26 OCT 1990

Atti della Società Italiana di Scienze Naturali e del Museo Civico di Storia Naturale di Milano

Vol. 131 (1990), n. 5, pag. 105-136

Milano, maggio 1990

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The genus *Aeger* Münster, 1839 in the Sinemurian of Osteno in Lombardy (Crustacea, Decapoda)

Abstract — The present paper deals with a sample of 186 specimens of natantian decapods from the Lower Sinemurian of Osteno (Como). All specimens are attributed to the genus *Aeger* Münster, 1839, of which six new species are described.

Riassunto — Il genere *Aeger* Münster, 1839 nel Sinemuriano di Osteno in Lombardia (Crustacea, Decapoda). Viene analizzato un campione di 186 esemplari di decapodi natanti provenienti dal giacimento sinemuriano di Osteno (Como). Tutti gli esemplari sono attribuiti al genere *Aeger* Münster, 1839, del quale vengono descritte sei nuove specie.

Key words: Crustacea, Decapoda, Jurassic, Italy.

Introduction

The fossil fauna of the Sinemurian deposit of Osteno, located in Italian territory on the eastern bank of the lake Lugano, is well known for the particular conditions of fossilization. In fact, not only the hard and more resistant parts of organisms are preserved, but also the soft ones. The fossiliferous strata, assigned to the «*bucklandi* zone» of the Lower Sinemurian for the presence of *Coroniceras bisulcatum* (Brug.) (Pinna, 1967), contain the rests of numerous organisms, including plants, fishes, cephalopods, echinoderms,

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«worms» of various types and numerous species of crustaceans. This material has been for years matter of study for the Department of Palaentology of the Museo Civico di Storia Naturale di Milano, and has supported the base for a number of publications on the fauna (for references see Pinna, 1985). Among macroinvertebrates, the decapod crustaceans represent about 50% of the individuals of the fauna. Only the reptant decapods of the genus *Coleia* Broderip, 1835 have been till now matter of specific publications (Pinna, 1969, 1972; Teruzzi, 1990).

This paper deals with decapod penaeids; they are assigned here to the genus *Aeger* Münster, 1839, of which six new species are described. The penaeid crustaceans are abundant in Osteno (about 30% of the individuals among decapod crustaceans). Many specimens are almost complete in every part, including the most delicate parts as antennae and antennules; they are laterally compressed, as it happens in other similar gisements, e.g. the Upper Jurassic of Solnhofen or the Cretaceous of Lebanon; therefore, the detailed reconstruction of their structures is sometimes difficult because they are compressed one upon the other. Moreover many specimens are fragmentary due to difficulty of extraction; for this reason we were able to assigne with certainty to a specific entity only 33 of the 186 specimens of penaeids belonging to the collection of the Museum of Milan.

Order Decapoda Latreille, 1803
Suborder Dendrobranchiata Bate, 1888
Superfamily Penaeoidea Rafinesque, 1815
Family Penaeidae Rafinesque, 1815
Genus *Aeger* Münster, 1839

The genus *Aeger* Münster, 1839 has been the matter of a recent review by Förster, 1967. According to this author it's characterized by a laterally compressed cephalothorax generally with a rectangular profile, and a length usually twice the height. The surface of cephalotorax, according to Förster, shows 3 main grooves: cervical, branchiocardiac, hepatic; the gastroorbital groove is never present, while postorbital carina always is. The elements of 3rd maxilliped carry along the posterior margin a row of long spines at the base of which smaller spines get detached. The first three pairs of pereopods are chelated, with dactylus and propodite supplied with spines. The abdominal somites are growing in length posteriorad. The exopodite shows a clear diaeresis with a strongly bending course and with a medially directed convexity. The genus *Aeger* is well known from Middle Trias to Upper Cretaceous; its distribution is essentially tethyan.

Aeger foersteri n. sp.
Figs. 1, 10, 11, 12.

Derivatio nominis: The species is dedicated to dr. Reinhard Förster, from München, well renowned specialist of fossil malacostracans, recently disappeared.

Holotype: N. cat. MSNM/i 8749, Collection of the Museo Civico di Storia Naturale di Milano.

Type-locality: Osteno (Como).

Geological age: Lower Sinemurian, «*bucklandi* zone».

Diagnosis: Subrectangular dumpy carapace with anteriorly shrinking ventral margin; short and toothless rostrum; carapace with four grooves (cervical, postcervical, branchiocardiac, hepatic), postorbital carina, antennal and hepatic spines; stylocerite elongated and distally sharp; elongated and distally expanded scaphocerite; 3rd maxilliped with a line of long spines and another of shorter ones, reciprocally alternating; I-II-III pairs of pereopods of growing length and chelated; IV and V pair with terminal dactylus, longer than the preceding ones. Abdominal somites growing in length posteriorad; posterior margin of pleurae of the first three ones sinuous; pleural margin of IV and V backwards protruded; VI somite rectangular; triangular distally sharpened telson; exopodite with diaeresis.

Material. Eight specimens are assigned to this species (n. cat. MSNM/i8742, i8743, i8744, i8745, i8746, i8748, i8749), four of which of small size (5-6 cm) and lacking pereopods and 3rd maxilliped; four specimens of bigger size (about 11 cm) and better preserved.

Description. *A. foersteri* is an elongated penaeid of moderate size, with thin and granulated exoskeleton; the holotype, the biggest specimen (fig. 12), has a maximum length of 11 cm.

Carapace is more elongated in smaller specimens; in the bigger ones it is rather dumpy and shrinks anteriorly. In the smaller specimens the dorsal margin is straight, while it becomes weakly convex in the bigger ones. The posterior margin is sinuous: concave on the inferior and superior thirds, convex on the median third; it is paralleled in the dorsal region by a thin groove.



Fig. 1 — *Aeger foersteri* n. sp.; n. cat. MSNM/i8743, line drawing ($\times 4$).

Rostrum is short and toothless. The ocular incision is narrow and little deep; the antennal angle is provided with an antennal spine. In the anterior region of carapace there are a postorbital carina and the antennal spine; the cervical and postcervical grooves run parallel and are joined in the median part of the carapace by a short and thin groove. At the end of the cervical groove there is the hepatic spine. The branchiocardiac groove, dorsally convex, joins at acute angle the hepatic groove about at the half of carapace.

The first three abdominal somites are growing in length, they have rounded pleurae and sinuous posterior pleural margin, with a less pronounced sinuosity on the third somite; on the fourth and fifth somite the posterior margin of pleurae is backward protruded. The sixth somite is more developed in length and less in height compared to the other ones. Telson is triangular and shows on both sides a line of lateral tubercles. Uropods are about one third longer than telson; exopodite has an arch-shaped diarsis, with a proximal convexity.

Cephalic appendages are well preserved only on the specimens of bigger size. Eyes are supported by a stalk whose length is half of that of the rostrum. Antennules have an elongated stylocerite distally sharpened. On the contrary scaphocerites are distally expanded. Generally the length of antennae and antennules cannot be evaluated: only specimen (MSNM/i8748, fig. 11) shows entirely preserved antennae, whose length is in this case about the same of the body's.

The 3rd maxilliped is very developed and sturdy; on the bigger specimens it is possible to observe the last four articula, of proximally decreasing length. Dactylus, propodus and merus carry on the posterior margin a line of long spines regularly alternated with a line of smaller spines. Thinner and shorter spines are born at the base of the bigger spines. The first three pairs of pereopods are chelated and of growing length; merus presents small spines on the posterior margin. The fourth and the fifth pair of pereopods are longer than the previous ones and have a terminal dactylus.

Pleopods are well developed; the simpodyte ends externally with a curved spine and supports two long articulated flagella.

Observations and comparisons. Among the species of *Aeger* known in the paleontological literature, *A. laevis* Blake, 1876, of the Lower Sinemurian of Lyme Regis, is the closest to *A. foersteri*. Of *A. laevis* only the carapace and abdomen are known, but not the various appendages. The carapace of Blake's species is different from the new species for the dorsal and posterior margin which are rectilinear rather than sinuous, for the less protruding rostrum, for a much more obtuse, and only slightly outlined antennal and pterigostomial angles.

Anyway, the most evident difference is given by the course of grooves and carinae. Particularly in *A. laevis* the cervical and postcervical grooves have no parallel course as in *A. foersteri*, where they are joined by a short groove, but the cervical joins the hepatic groove with a short angle, while the postcervical joins the branchiocardiac groove. Moreover, while in the English species all the abdominal somites have straight pleurae, in our species the first three somites have sinuous pleurae, the fourth and the fifth have backwards protruded pleurae.

Discussion. The smaller sized specimens (5-7 cm; cfr. figs. 1, 10) are much less well preserved than the bigger sized ones and in particular it is very difficult to notice the morphological characteristics of the carapace, and appendages of any type are not well preserved. These specimens are assigned to the new species for the similarities in the ratio length/width of the carapace, in the length of the 3rd maxilliped's various articles and above all for similarities of the abdomen, the best preserved part in the smaller specimens; the morphology of abdominal somites and telson perfectly follows that of the equivalent parts of the bigger specimens.

Aeger muensteri n. sp.

Figs. 2, 3, 13, 14.

Derivatio nominis: the species is dedicated to the German paleontologist Georg Graf zu Münster.

Holotype: N. cat. MSNM/i8752.

Type-locality: Osteno (Como).

Geological age: Lower Sinemurian, «*bucklandi* zone».

Diagnosis: Dumpy carapace, weakly shrinking anteriorly; the dorsal margin extends to a long rostrum with a tooth in the median part of the lower margin; carapace with an unique groove in central position; elongated scaphocerite with rounded distal extremity; antennae with very elongated and thin flagella; 3rd maxilliped with an unique line of long and thin spines; first three pairs of pereiopods chelated; first five abdominal somites of uniform length, subtriangular shape and rounded pleurae; VI somite rectangular; triangular sharpened telson; exopodite with diaeresis.

Material. Three specimens are assigned to the new species (n. cat. MSNM/i8750, i8751, i8752); two of them are small sized, with no 3rd maxilliped and no pereiopods, and one is bigger sized, endowed with thoracic and cephalic appendages.

Description. Elongated penaeid with a thin and granulated exoskeleton, of considerable size: the bigger specimen, the holotype, reaches the maximum length of 13,5 cm (fig. 2).

Carapace can be observed in lateral view on all the specimens. It is more elongated in the smaller specimens (figs. 13, 14) while it is thicker in the bigger specimen, on which it shrinks slightly anteriorly. The dorsal margin of the smaller sized specimens is strongly protruded backwards; on the bigger specimen both margins are rectilinear. Rostrum is well developed (3,5 cm long on the type) with a median tooth on the lower margin; on the smaller specimens it is situated on the distal third of the rostrum. The ocular incision, immediately under the rostrum is narrow and little deep. The ventral margin of the carapace is rectilinear. On the type, in the median region of carapace there is an unique groove, that runs antero-posteriorly, firstly parallel to the ventral margin and after bending at 45° towards the dorsal margin.

Sufficiently well preserved in all specimens, abdomen shows the first five

somites with a subrectangular shape and uniform length, with straight pleurae.

In the smaller specimens pleurae of the fourth and the fifth somites are backwards protruded, while on the type they have a rectilinear course. The sixth somite is of rectangular shape and it is longer than the other ones. The pleural margins are rounded. The telson is triangular, distally sharpened. Even if uropods are badly preserved, it's however possible to note the presence of a diaeresis on the exopodite. They exceed for about 1/3 the telson in length. The curvature of the abdomen is similar to that observed in the present penaeids.

The specimens preserve traces of well developed, almost circular eyes. Well preserved on the type, the scaphocerite has an elongated shape



Fig. 2 — *Aeger muensteri* n. sp.; holotype, n. cat. MSNM/i8752 photo ($\times 3$).

with rounded distal extremity. The flagella of the antennae are very long and thin.

Thoracic appendages are well preserved on the type. The 3rd maxilliped is very elongated and thin: its four terminal elements are visible, whose strength increases in proximally. All the elements carry along the posterior margin a row of long and thin spines. On the dactylus, on the opposite margin there is another line of spines. The first three pairs of pereopods are not very well preserved; the fourth and the fifth pairs, slender and with terminal dactylus, are longer than the previous pereopods and the 3rd maxilliped.

Pleopods are considerably well preserved only on type. They show a well developed simpodyte whose external margin ends inferiorly with a hook; on the basipodite two long flagella articulate.

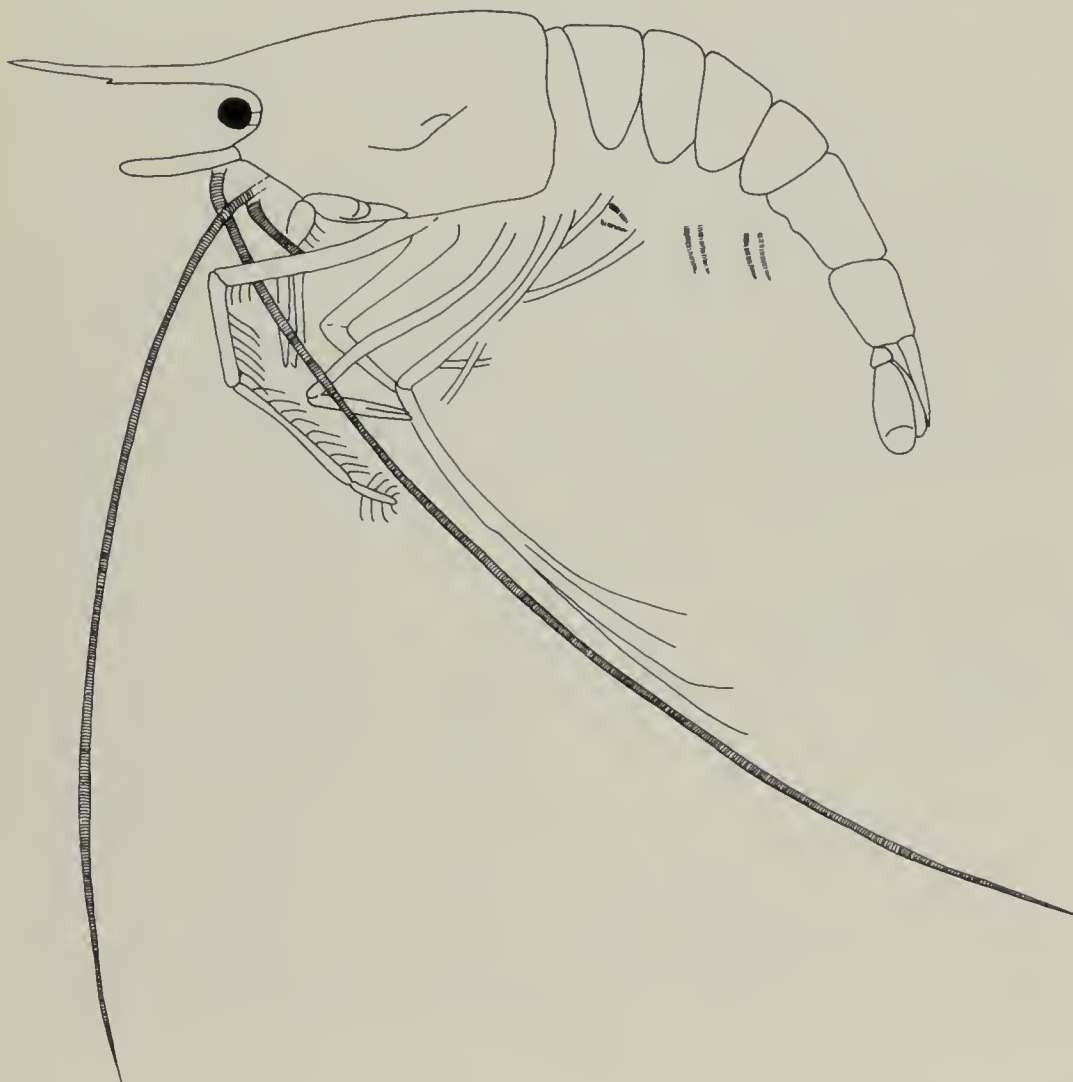


Fig. 3 — *Aeger muensteri* n. sp.; holotype, n. cat. MSNM/i8752 reconstruction ($\times 1.3$).

Discussion. Though the smaller specimens are less well preserved compared to the type specimen, they are assigned to the same species for some features that can be observed also on the type, the best preserved specimen and the only one of big size. The scaphocerite is distally elongated and rounded on all the specimens; the first three somites have a similar triangular shape, and the sixth one is rectangular. On the rostrum of all the specimens there is a tooth on the lower margin. There are in any case differences among the smaller sized specimens and the type. In the latter the rostrum is more elongated (about 7/8 of the length of carapace versus 1/3 in the smaller specimens) and the tooth is in a median position on the lower margin instead of the anterior third; it also shows pleurae of the fourth and the fifth somites with a triangular shape similarly to those of the previous somites, while in the smaller sized specimens the posterior margin of pleurae is backwards protruded. Also the margins of carapace have a different course: in the smaller specimens the ventral margin is convex, the posterior one is backwards protruded, while on type the margins are rectilinear.

Aeger robustus n. sp.

Figs. 4, 15, 16, 17, 18, 19, 20, 21.

Derivatio nominis: due to the stoutness of the third pair of maxillipeds.

Holotype: N. cat. MSNM/i8759.

Type-locality: Osteno (Como).

Geological age: Lower Sinemurian, «*bucklandi* zone».

Diagnosis: elongated carapace, with ventral margin weakly raising anteriorly; the dorsal margin extends into a long rostrum with a tooth on the posterior third of the lower margin; the carapace shows a postorbital carina, the cervical groove and the branchiocardiac groove; elongated scaphocerite, di-



Fig. 4 — *Aeger robustus* n. sp.; n. cat. MSNM/i8762, line drawing ($\times 2.5$).

tally rounded; 3rd maxilliped with a line of long and thin spines; first three pairs of pereopods chelated; abdominal somites I-V of uniform size, subrectangular shape, rounded pleurae; sixth somite with square profile; triangular telson distally sharpened; exopodite with diaeresis.

Material. Ten specimens, four of which of small size and six well preserved and of big size, are assigned to the new species (n. cat. MSNM/i8753, i8754, i8755, i8756, i8757, i8758, i8759, i8760, i8761, i8762). The biggest specimen, the holotype (fig. 21), is 15 cm long.

Description. On all specimens the carapace is preserved in lateral view. It is elongated, with the ventral margin slightly raising on the anterior third. The dorsal margin in the smaller specimens (figs. 15, 16, 17) is slightly convex, while in the bigger ones (figs. 18, 19, 20, 21) has a rectilinear course. The posterior margin has the same course in all specimens: convex in the dorsal region and concave in the ventral one. In the bigger specimens, the dorsal margin elongates into a long rostrum (as far as 3 cm) with a sharpened distal extremity and a tooth on the posterior third of the lower margin. The ocular incision is narrow and little deep. In the smaller specimens only the branchio-cardiac groove can be detached, while in the bigger specimens also the cervical groove and the postorbital carina are visible.

Abdomen is well preserved in all specimens. The somites have an uniform length, rectangular shape and straight pleural margins. In the smaller specimens the sixth somite is rectangular, elongated in shape, while in the bigger specimens it is squared. The uropods are well preserved in all specimens; the exopodite shows a clearcut diaeresis. The telson has triangular shape with a sharpened distal extremity. The uropods exceed of about 1/3 the length of the telson.

The scaphocerite, elongated with rounded distal extremity, is preserved only in the smaller specimens while antennae and antennules are well preserved only on the bigger ones; eyes are kidney shaped.

The 3rd maxilliped is well developed in the bigger specimens; the last four elements, of proximally decreasing stoutness, can be observed. Dactylus, propodus, carpus and merus carry along the posterior margin a row of long and thin spines. Pereiopods are well preserved in the bigger specimens: the first three pairs are chelated and growing in length, and carry a line of small spines on both the margins; the fourth and the fifth pairs are long and thin, with a terminal dactylus, and exceed in length either the first three pairs and the 3rd maxilliped.

Abdominal appendages are well preserved in the bigger specimens. It's possible to observe two kinds of pleopods: on the holotype (fig. 21) the pleopod is composed by a simpodyte which terminate externally with a hook and it's without any ornamentation; on the specimen MSNM/i8757 the pleopod is composed by a simpodyte which shows, along the external side, a line of small tubercles and ends without the spine which can be observed on the type.

Discussion. Though the smaller sized specimens are less well preserved of the bigger sized ones, they are assigned to the same species for some

features which can be observed also in the bigger specimens. In all the specimens the dorsal margin of carapace is weakly convex. The posterior margin modifies itself during the development: in the smaller specimens it has a rectilinear course while in the bigger ones it is concave in the dorsal region and convex in the ventral one. The smaller specimens bear on the surface of the carapace only the branchiocardiac groove, while in the bigger specimens it's possible to observe, besides the branchiocardiac groove, the cervical one and a postorbital ridge. All the specimens have abdominal somites with uniform length, rectangular shape and rounded pleurae. The bad conditions of preservation of the 3rd maxilliped, of the five pairs of pereopods and of the five pairs of pleopods in the smaller specimens do not allow a comparison of their appendages with those of the bigger specimens. The telson and the uropods show the same structure on all the specimens.

Among the species of *Aeger* known in the palaeontological literature, *A. marderi* Woodward, 1866, of the Lower Sinemurian of Lyme Regis, is the most similar to *A. robustus*. The carapace has a similar shape with a convex dorsal margin and the posterior one concave in the dorsal region and convex in the ventral one. The carapace shows the same grooves and ridges: postorbital ridge and cervical and branchiocardiac grooves. The only difference is the presence, in *A. marderi*, of the hepatic groove not present in *A. robustus*. As in the latter species, in *A. marderi* too the first four articles of 3rd maxilliped carry, along the posterior margin, a line of long and thin spine, the first three pairs of pereopods are chelated and pereopods IV-V have a terminal dactylus. With reference to Förster, 1967, it's possible to find similarities between *A. robustus* and *A. marderi*, for the presence of spines on chelae of second and third pereopods.

Aeger rostrospinatus n. sp.

Figs. 5, 6, 7, 8, 22.

Derivatio nominis: for the rostrum characterized by the presence of numerous spines.

Holotype: N. cat. MSNM/i8768.

Type-locality: Osteno (Como).

Geological Age: Lower Sinemurian, «*bucklandi* zone».

Diagnosis: Elongated carapace weakly shrinking towards the anterior margin; the dorsal margin extends itself into a long rostrum which carries two teeth on the upper margin and a median tooth on the lower margin; there is a notched ridge with four teeth situated at the base of the rostrum and an epigastric tooth on the anterior of the dorsal margin; abdominal somites with uniform length except the third one which is longer than the others somites; pleopods formed by a simpodite on which two flagella articulate; triangular telson with sharpened distal extremity.

Material: Six complete small size specimens well preserved and a well preserved big sized specimen of which we have part and counterpart are assi-

gned to the new species (n. cat. MSNM/i8763, i8764, i8765, i8766, i8767, i8768, i8769).

Description. It is an elongated penaeid of considerable size, with thin and granulated exoskeleton.

Carapace can be observed in lateral view in all the specimens. It has an elongated shape and weakly shrinks towards the anterior margin. The dorsal margin is slightly convex. The posterior margin is concave in the upper half and convex in the inferior half covering part of the first abdominal somite. In the smaller specimens (cfr. fig. 7), the dorsal margin extends into a short rostrum (mm 4) with sharpened distal extremity and a basal tooth; in the anterior third of the dorsal margin of the carapace there is an epigastric tooth. In the bigger specimen (cfr. fig. 22), the dorsal margin extends into a long rostrum (cm 1,5) slightly turning upwards, with sharpened distal extremity; the rostrum shows two teeth on the upper margin and a median tooth on the lower margin; moreover there are a carina formed by four teeth situated at the base of the rostrum and the epigastric tooth on the anterior third of the dorsal margin. The ocular incision is narrow and little deep. The badly preserved surface of carapace either in the smaller than in the bigger sized specimens does not allow to identify grooves, spines and ridges.

Abdomen is well preserved in all the specimens. The somites have a subrectangular shape and posterior pleural margins sinuous; they have an uniform length except the third one, that is longer than the others. The telson has a triangular shape with sharpened distal extremity. Uropods are badly preserved in all the specimens and it's not possible to ascertain the presence of diaresis on the exopodite.

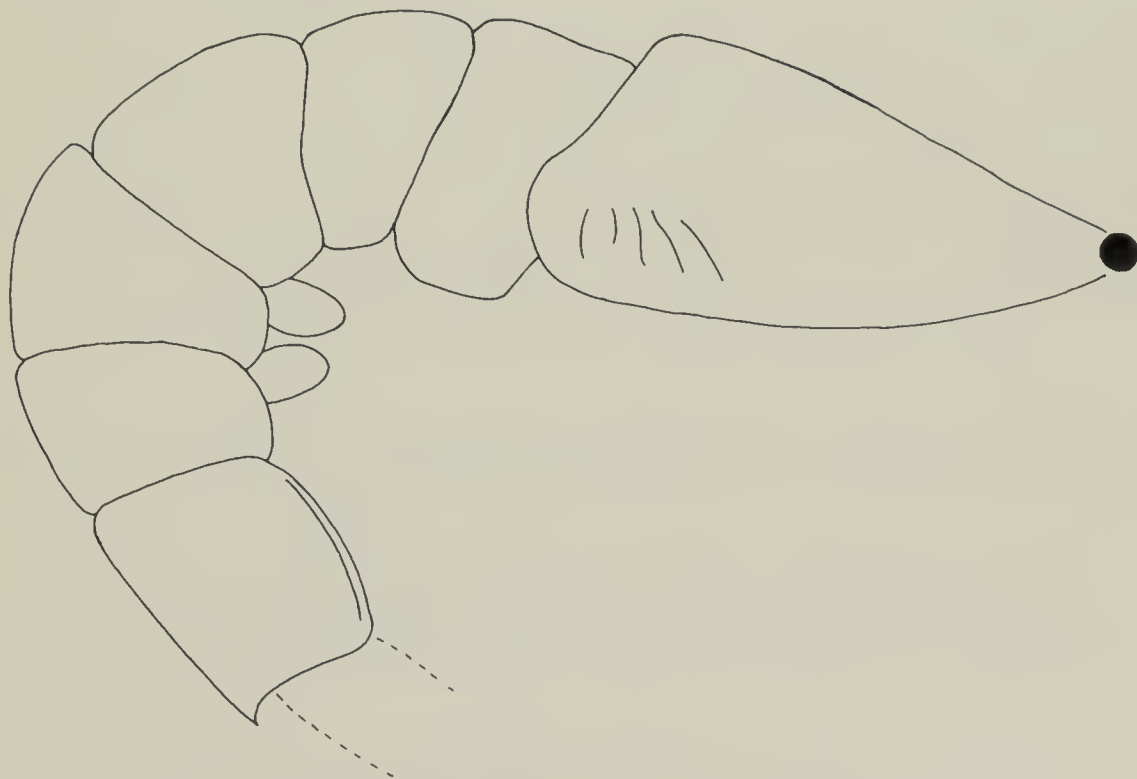


Fig. 5 — *Aeger rostrospinatus* n. sp.; n. cat. MSNM/i8764, line drawing ($\times 2,5$).



Fig. 6 — *Aeger rostrospinatus* n. sp.; n. cat. MSNM/i8765, line drawing ($\times 2,5$).

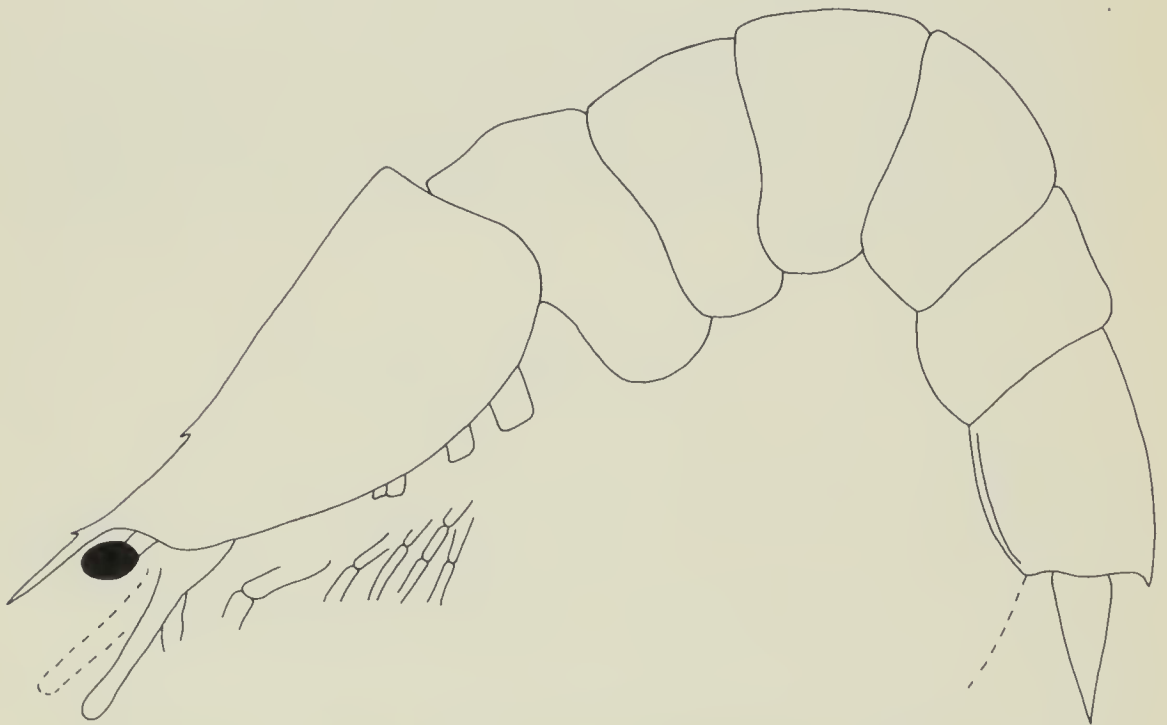


Fig. 7 — *Aeger rostrospinatus* n. sp.; n. cat. MSNM/i8767, line drawing ($\times 2,8$).

The eye has a short peduncle; the ocular incision is semicircular in shape as in most of the other species. The scaphocerite is elongated, with rounded distal extremity. The antennules and antennae cannot be observed as they are badly preserved.

In the biggest specimen thoracic appendages cannot be observed; in the smaller specimens fragments of the 3° maxilliped and of the first two pairs of pereopods are visible.

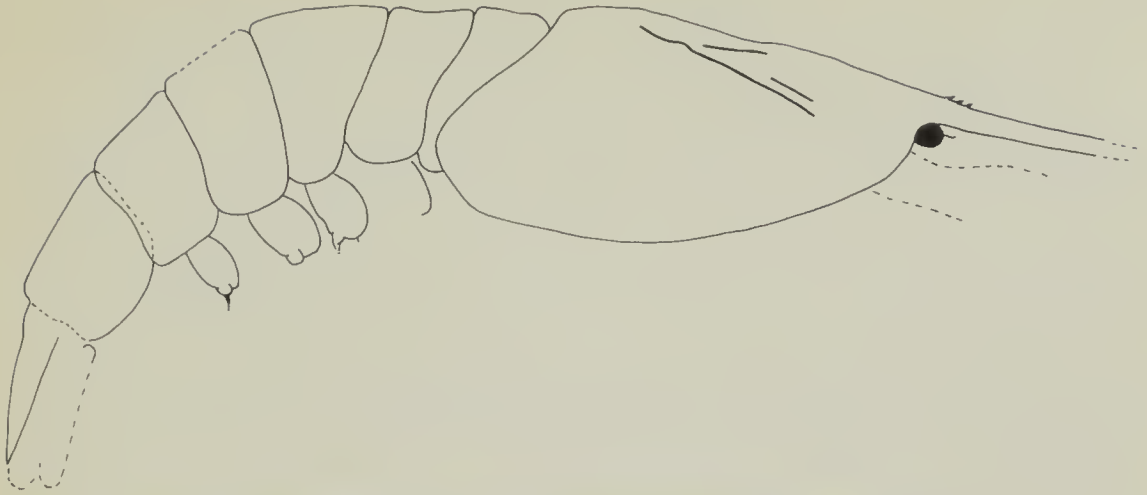


Fig. 8 — *Aeger rostrospinatus* n. sp.; n. cat. MSNM/i8769, line drawing ($\times 1,2$).

Abdominal appendages can be observed only in the smaller specimens. They are formed by a sympodite which, in the central part of the inferior margin, is hollowed to receive the basipodite on which two articulated flagella articulate.

Discussion. Though the smaller sized specimens are less well preserved than the type specimen, they are assigned to the same species for some features that can be observed also on the type specimen, which is also the best preserved one and the unique of adult size.

Aeger macropus n. sp.

Fig. 23.

Derivatio nominis: due to the very stout and elongated second and third pereopods.

Holotype: N. cat. MSNM/i8770.

Type-locality: Osteno (Como).

Geological Age: Lower Sinemurian, «*bucklandi* zone».

Diagnosis: Elongated carapace, which slightly shrinks towards the anterior margin; the dorsal margin extends itself into a long and toothless rostrum; stylocerite elongated with sharpened distal extremity; expanded scaphocerite; 3rd maxilliped with an unique line of long and thin spines; second pereopods with well developed chelae; the third pair of pereopods with very elongated elements; abdominal somites with uniform length, triangular shape and rounded pleurae; sixth abdominal somite with a rectangular shape; telson with a triangular shape and sharpened distal extremity; expodite with diaeresis.

Material: Only one well preserved big specimen (fig. 23) is assigned to the new species.

Description. It is a penaeid of elongated shape and considerable size (cm 16), with thin and granulated exoskeleton.

Carapace. It can be observed in lateral view. The posterior margin is concave in the dorsal region and convex in the ventral one. The ventral margin has a curved course. The dorsal margin extends into a long (cm 1,7), straight, toothless and sharpened rostrum. The ocular incision is rounded and little deep, limited inferiorly by a rather pronounced antennal angle. The badly preserved surface of the carapace does not allow the identification of grooves, spines and ridge.

Abdominal somites I-V have an uniform length, triangular shape and rounded pleurae. The sixth somite has a rectangular shape. The telson is triangular, with sharpened distal extremity. The uropods, which exceed of about one third the length of the telson are well preserved. The exopodite shows a diaeresis.

Cephalic appendages are quite well preserved. One of the two eyes is preserved, slightly dislocated, and does not preserve the ocular peduncle. The three basal articles and fragments of the flagella of only one antennule are preserved; the stylocerite has an elongated shape and sharpened distal extremity. Of the antennae, only the very elongated scaphocerite is preserved in situ, while one of the two flagella looks bended under the cephalotorax and the other is dislocated among the pereopods. The stylocerite and the scaphocerite exceed in length the rostrum.

The 3rd maxilliped is well developed and sturdy; are four articles of proximally decreasing stourdness the last preserved. Dactylus, propodus, carpus and merus carry, along the posterior margin, a line of long and thin spines. Only one leg of pereopods either first and second, both with elongated chelae, are preserved. In the third pair of pereopods, propodus and merus are so much developed as to exceed in length either the second pair and the 3rd maxilliped. The merus and part of the carpus of fourth and fifth pereopods, much thinner, are preserved.

Pleopods are of considerable size. They are formed by a well developed sympodite with a line of small tubercles along the external side; the basipodite carries two long flagella.

Aeger elongatus n. sp.

Fig. 24.

Derivatio nominis: due to the elongated shape of the body.

Holotype: N. cat. MSNM/i8772.

Type-locality: Osteno (Como).

Geological Age: Lower Sinemurian, «*bucklandi* zone».

Diagnosis. Carapace which weakly shrinks towards the anterior margin; the dorsal margin extends into a long and toothless rostrum; scaphocerite with elongated shape and rounded distal extremity; the 3rd maxilliped is characterized by an unique line of long and thin spines; abdominal somites I-V are of uniform length, rectangular shape and subrounded pleurae; sixth

somite of rectangular shape; triangular telson with sharpened distal extremity; exopodite with diaeresis.

Material: Two specimens enough complete one of which of small size and the other one of big size are assigned to the new species (n. cat. MSNM/i8771, i8772).

Description. Elongated penaeid of considerable size (cm 12) with thin and granulated exoskeleton.

Carapace has an elongated shape and shrinks weakly towards the anterior margin. It's not possible to observe the course of the posterior and ventral margins due to the bad preservation. The dorsal margin is slightly convex and extends into a long rostrum (1 cm on the bigger specimen) bent downwards, toothless and with sharpened distal extremity. The ocular incision is narrow and little deep, limited in the inferior part by a pronounced antennal angle, supplied with two spines. The postorbital ridge and the branchiocardiac groove can be observed on the carapace.

Abdominal somites I-V have an uniform length, subrectangular shape and sinuous posterior margins. The sixth somite has rectangular shape and it is longer than the other ones. The pleural margin of the third and the fourth somites is fringed by small spines on the posterior half of the margin itself. Telson is triangular, with sharpened distal extremity. The exopodite shows a diaeresis and exceed of about one third the length of the telson.

Cephalic appendages are enough well preserved. The eye is slightly dislocated compared to the original position. The scaphocerite has an elongated shape with rounded distal extremity. Fragments of flagella of antennules and antennae can be observed.

The 3rd maxilliped is very well developed and thin; the last four articles are of proximally decreasing stoutness. Dactylus, propodus and carpus carry, along the posterior margin, a line of long and thin spines. The first three pairs of pereopods are badly preserved and it's not possible to reconstruct them. The merus of the first and the third pair carry some small spines along the inferior margin. The fourth and fifth pairs are very long and thin so as to exceed in length either the first three pairs and the 3rd maxilliped.

Pleopods are of considerable size. They are formed by a well developed sympodite which ends on the external side with a curved spine, while the internal margin receives the basipodite on which two flagella articulate.

Conclusions

The natantian decapods of *Osteno* are not very differentiated at taxon level higher than the genus; at *Osteno* lack caridean natantians which are already represented in the Prealpine Upper Triassic (Pinna, 1974). Notwithstanding, penaeid shrimps, all reasonably to ascribe to the same genus, are very diversified at species level, following the taxonomic criteria used for living decapods (see for example Pérez Farfante, 1969). The *Osteno* species are recognizable for differences in rostrum length and in rostral teeth formula, for the presence of different spines, grooves and ridges on the carapace, for differences in the shape of pleopods. All these species are clearly grouped together

by the presence of a strong 3rd maxilliped supplied by one or two rows of spines.

Such a noticeable taxonomic diversity at species level can be recognized at Osteno in other decapod groups, as pointed out for the genus *Coleia* Broderip, 1835 by Teruzzi, 1990. According to the latter author, this taxonomic diversity could be reconducted to environmental factors.

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Fig. 9 – Synoptic table of main morphological characteristics of new species of *Aeger* from Osteno. On the left: carapaces; on the right: pleopods.

- 1) *A. foersteri* n. sp., IV-III pleopods; 2) *A. muensteri* n. sp., III pleopod; 3) *A. robustus* n. sp., IV-III pleopods; 4) *A. rostrospinatus* n. sp., III pleopod; 5) *A. macropus* n. sp., III pleopod; 6) *A. elongatus* n. sp. III pleopod.

1



2



3



4



5



6



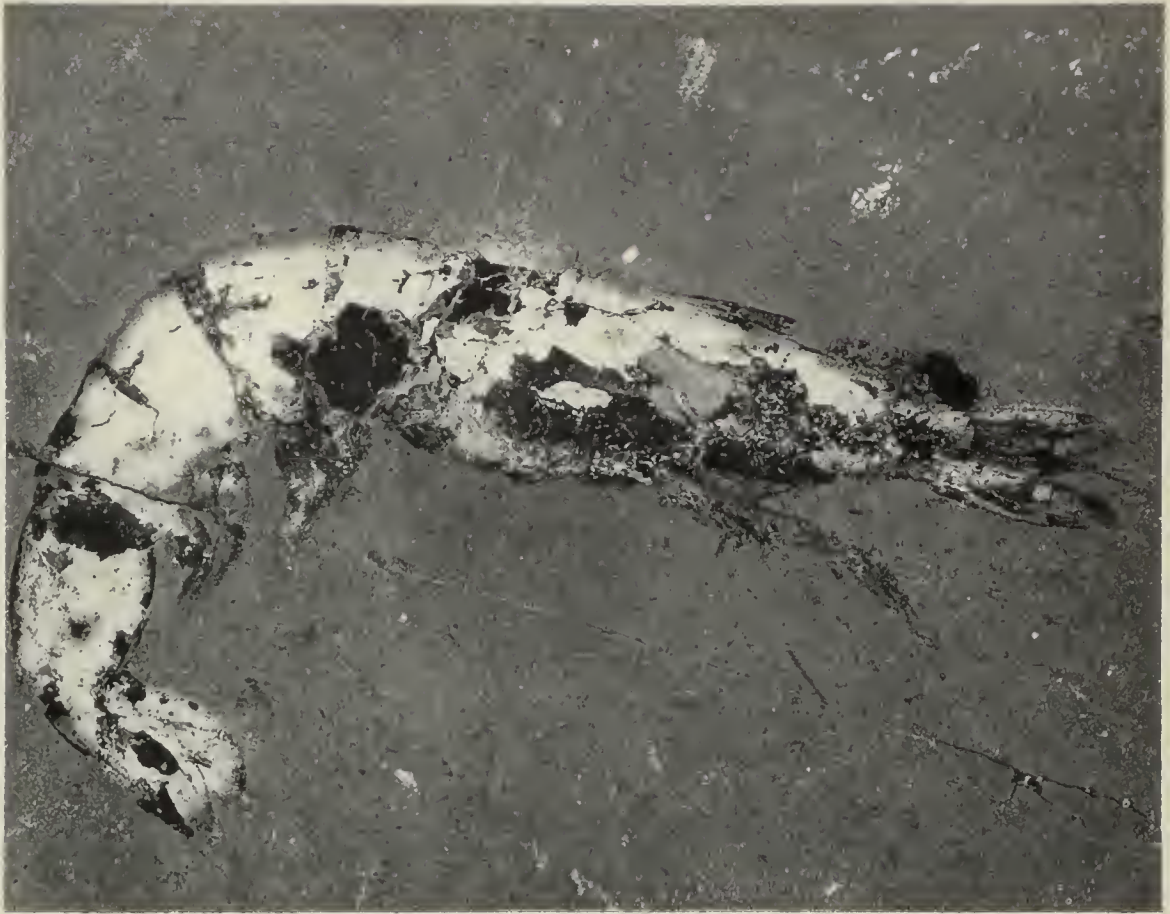


Fig. 10 — *Aeger foersteri* n. sp.; n. cat. MSNM/i8744 photo and reconstruction ($\times 2,3$).

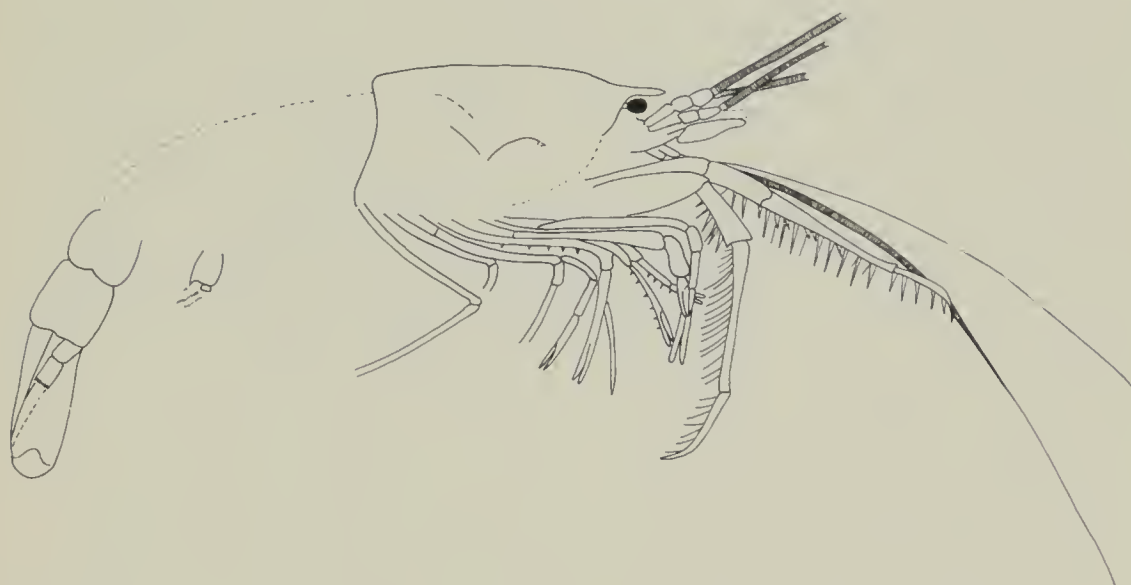


Fig. 11 — *Aeger foersteri* n. sp.; n. cat. MSNM/i8748 photo and reconstruction ($\times 0.8$).

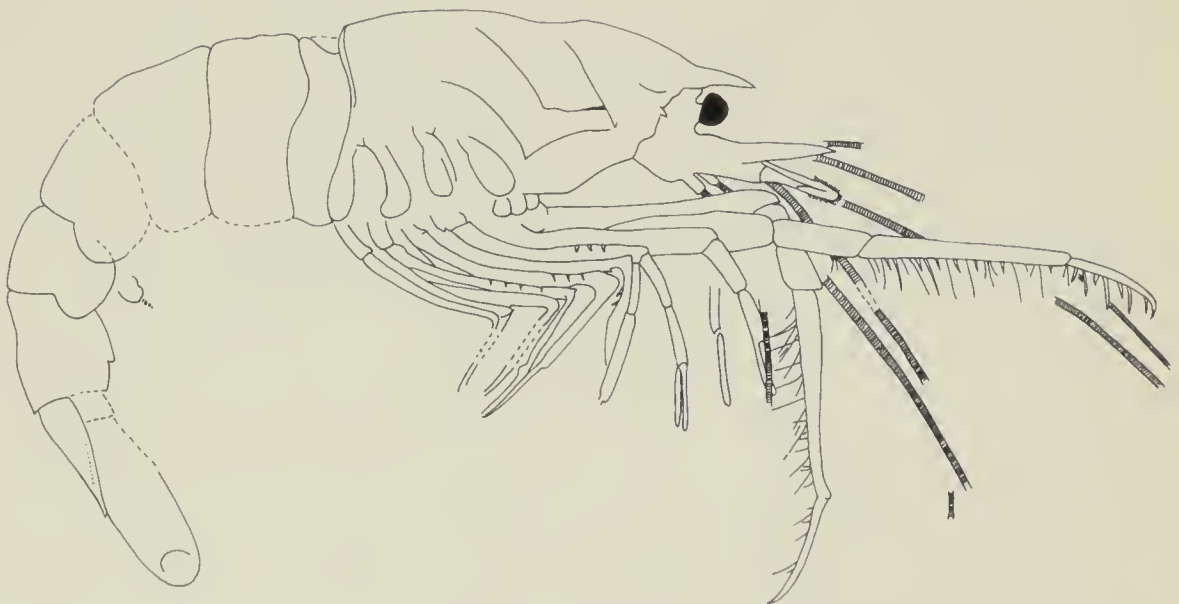
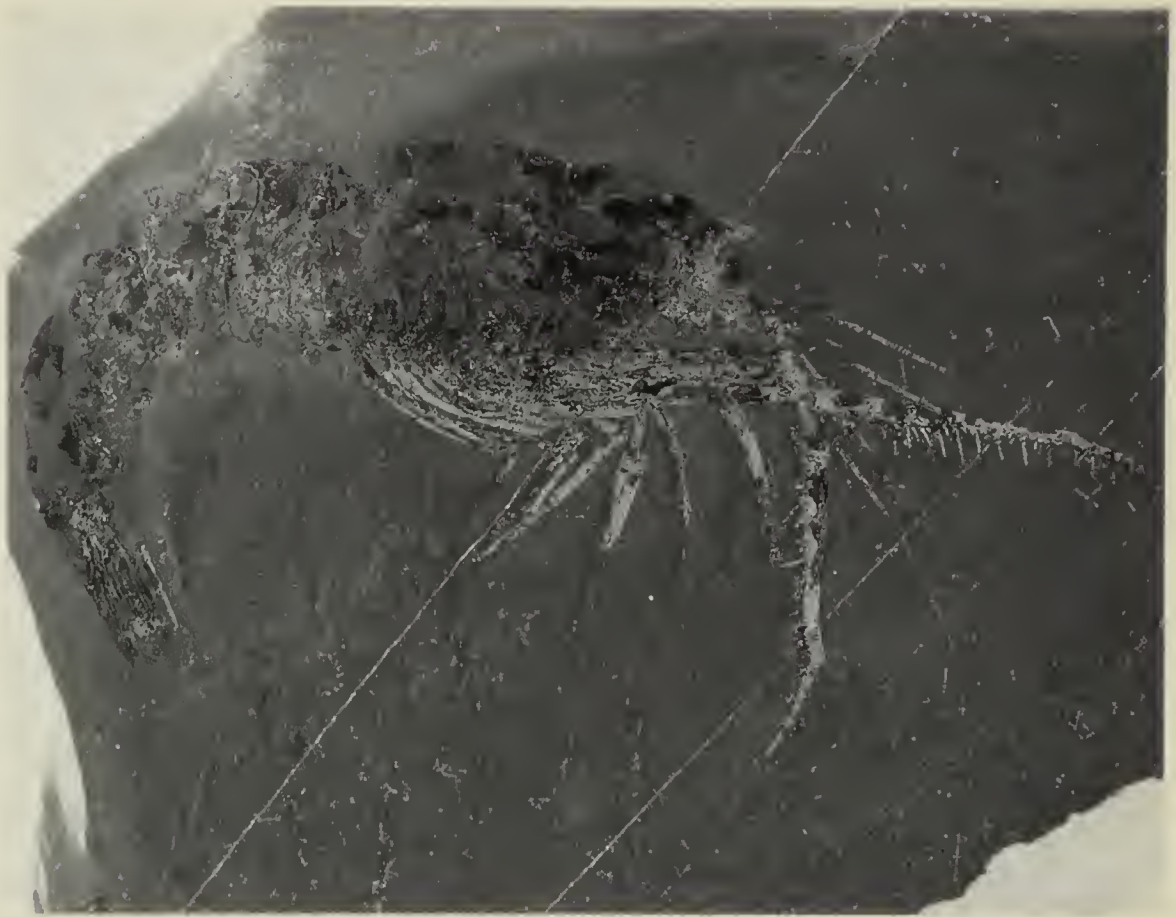


Fig. 12 — *Aeger foersteri* n. sp.; holotype, n. cat. MSNM/i8749 photo and reconstruction ($\times 1$).



Fig. 13 — *Aeger muensteri* n. sp.; n. cat. MSNM/i8750 photo and reconstruction ($\times 3$).

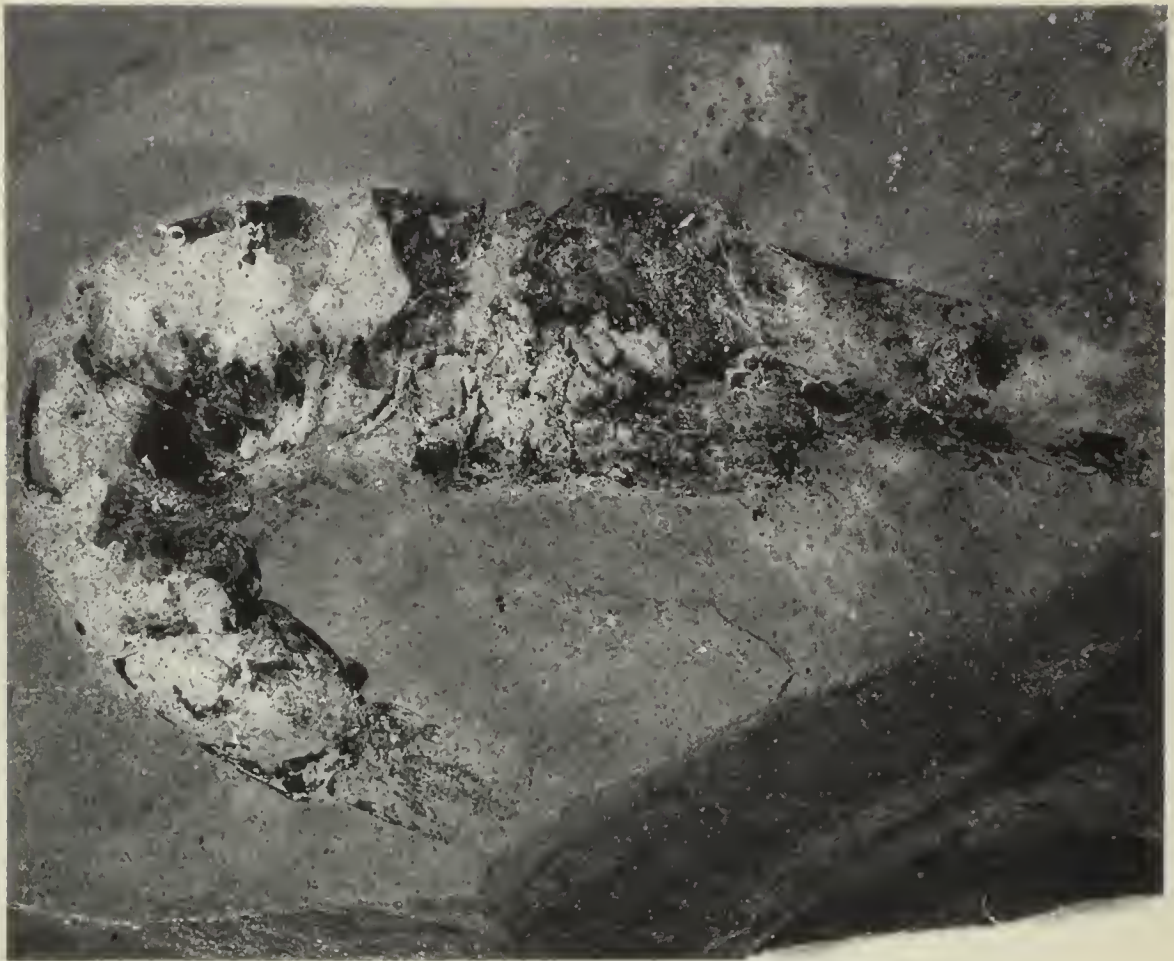


Fig. 14 — *Aeger mnensteri* n. sp.; n. cat. MSNM/i8751 photo and reconstruction ($\times 2,8$).

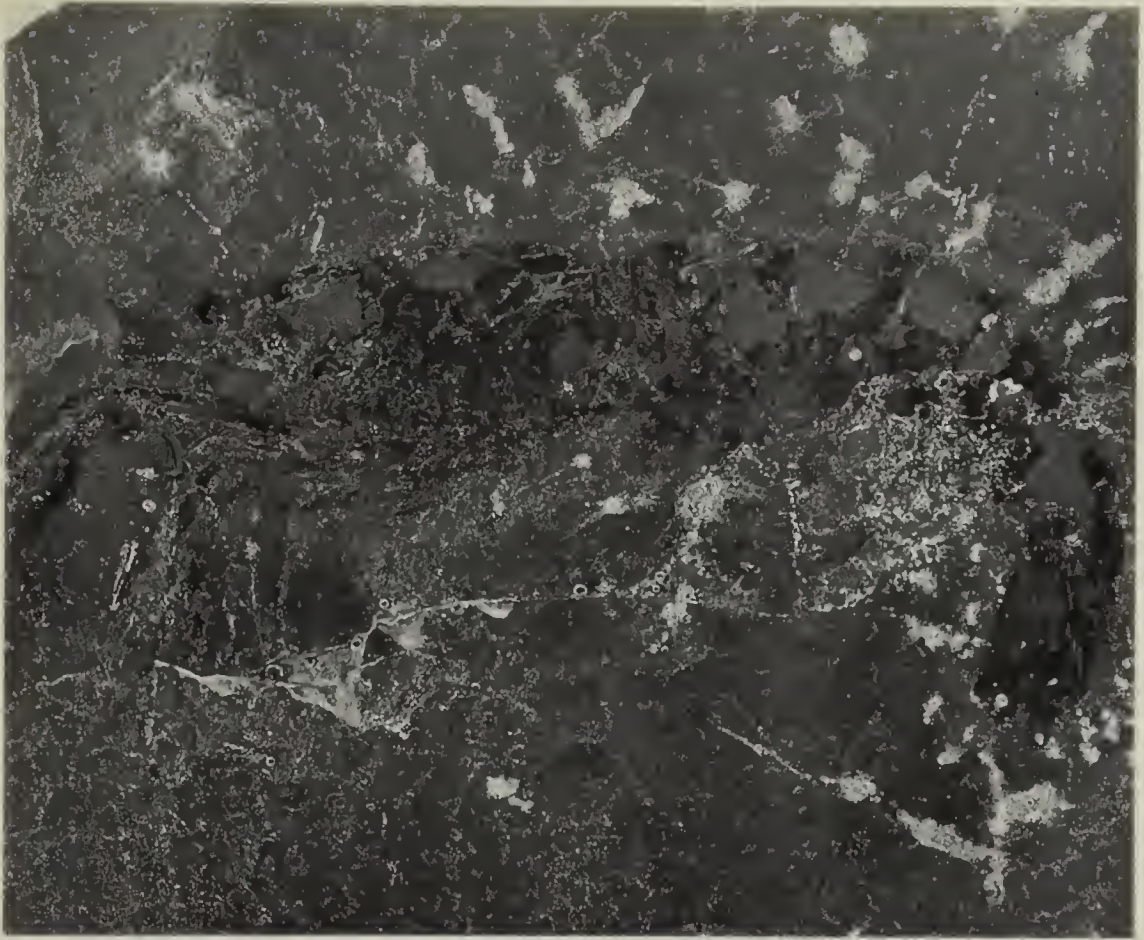


Fig. 15 — *Aeger robustus* n. sp.; n. cat. MSNM/i8753 photo and reconstruction ($\times 2,1$).

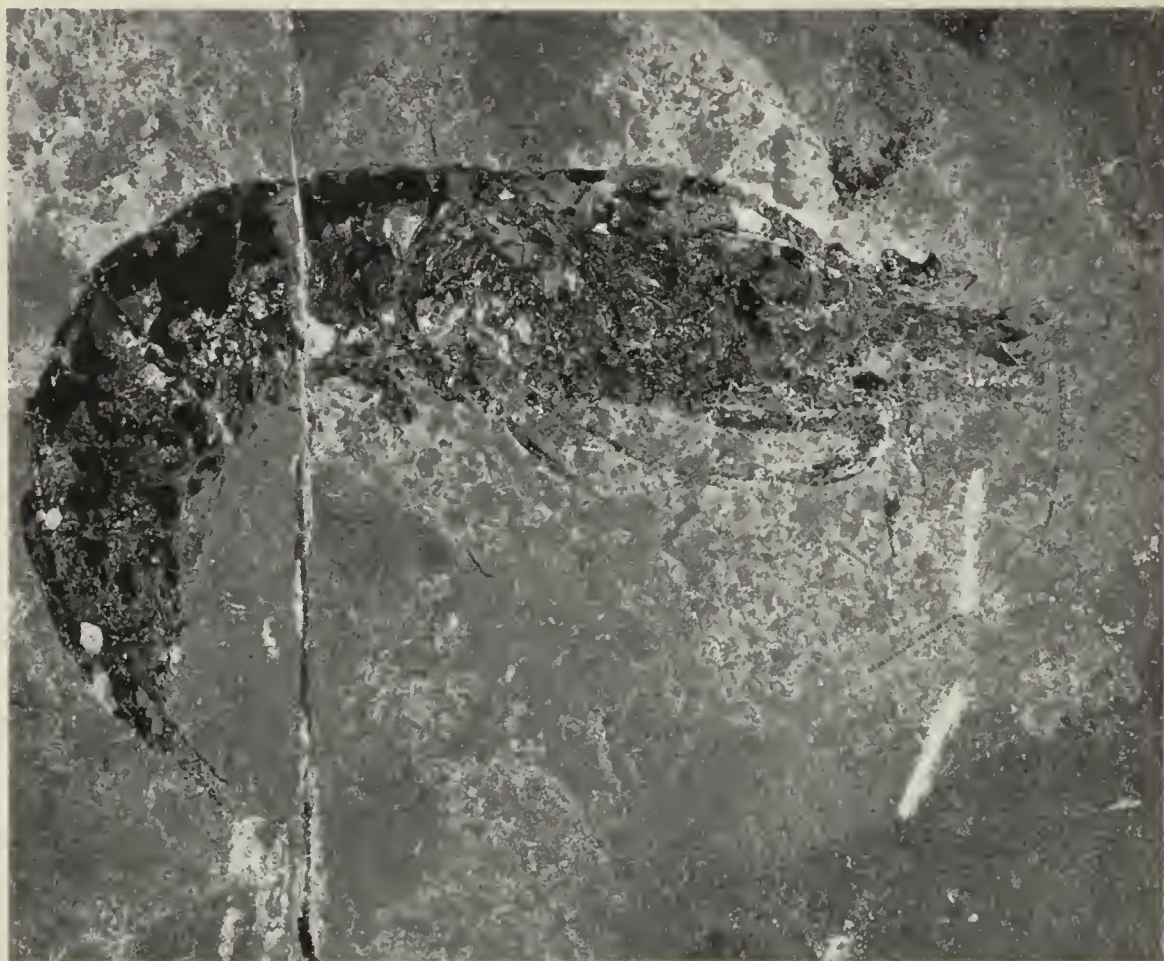


Fig. 16 – *Aeger robustus* n. sp.; n. cat. MSNM/i8755 photo and reconstruction ($\times 2.5$).

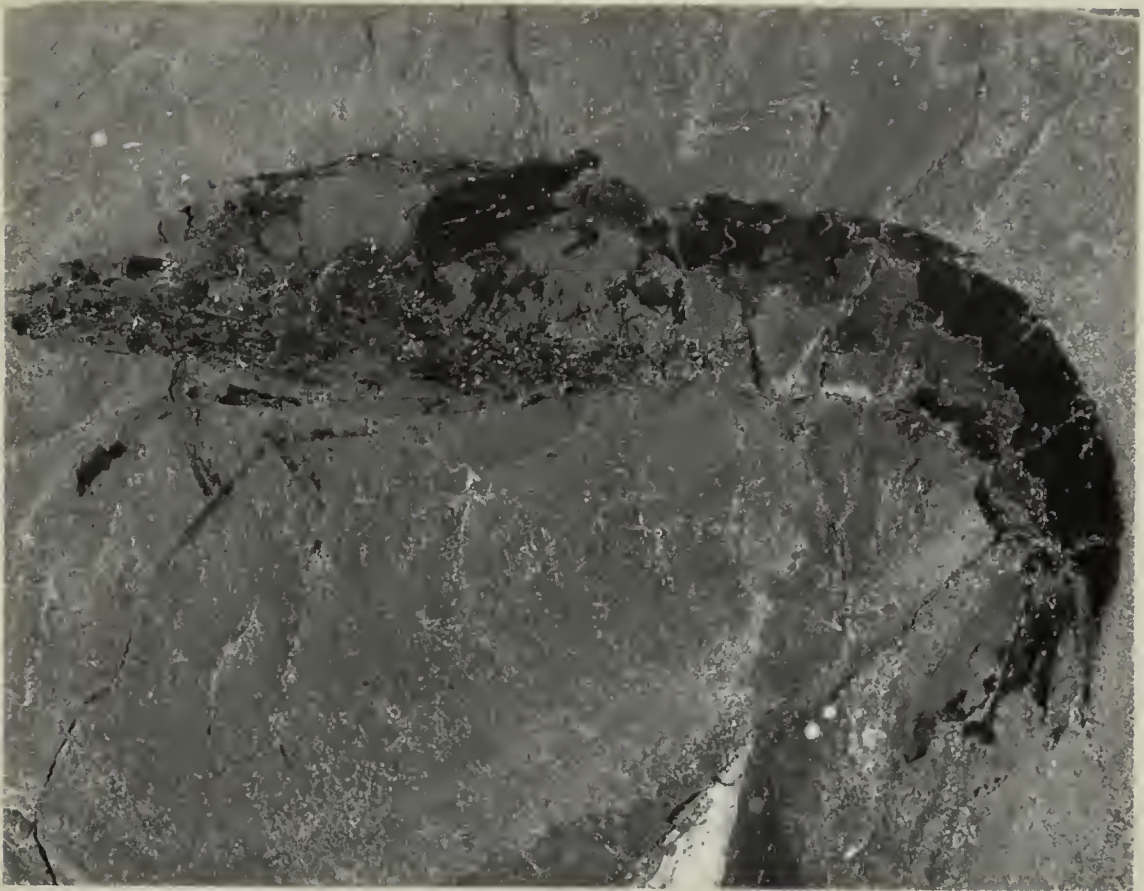


Fig. 17 — *Aeger robustus* n. sp.; n. cat. MSNM/i8754 photo and reconstruction ($\times 1.8$).

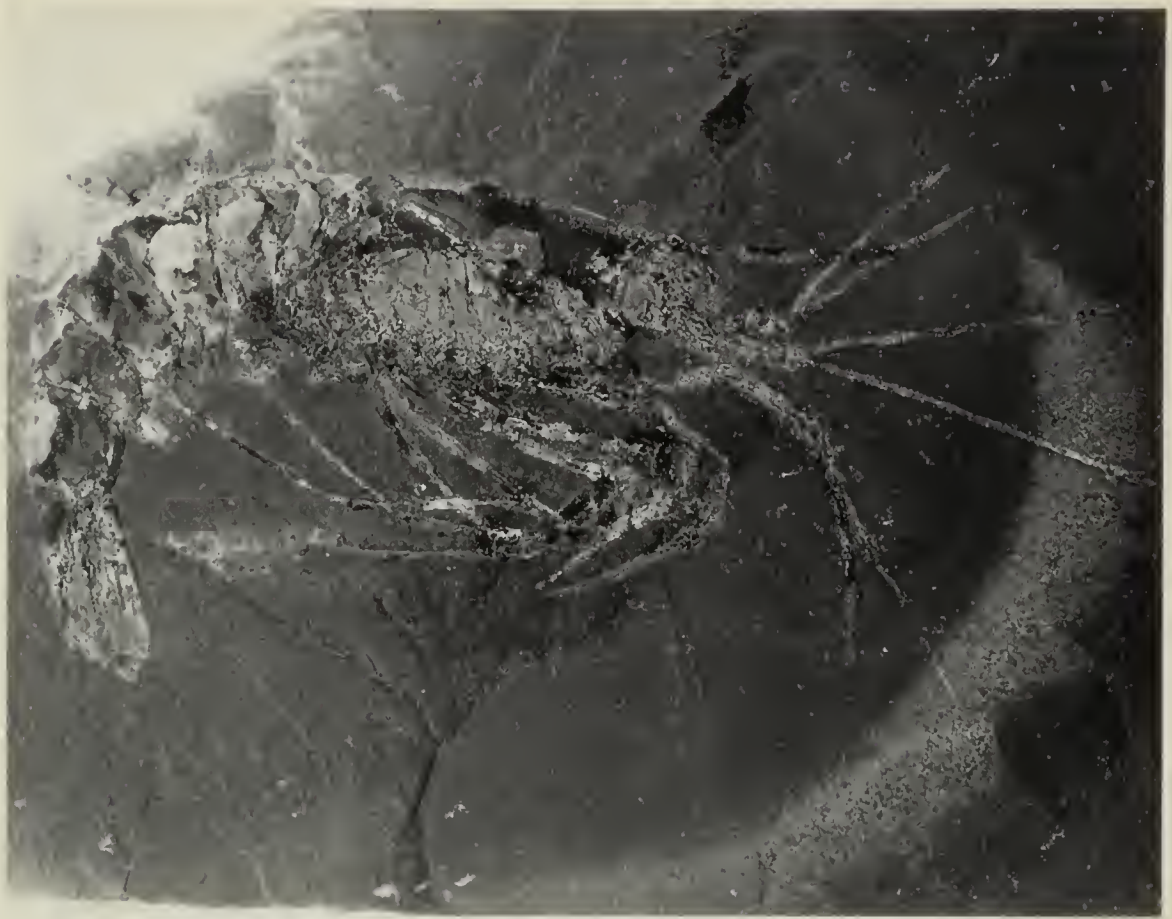


Fig. 18 — *Aeger robustus* n. sp.; n. cat. MSNM/i8757 photo and reconstruction (nat. size).

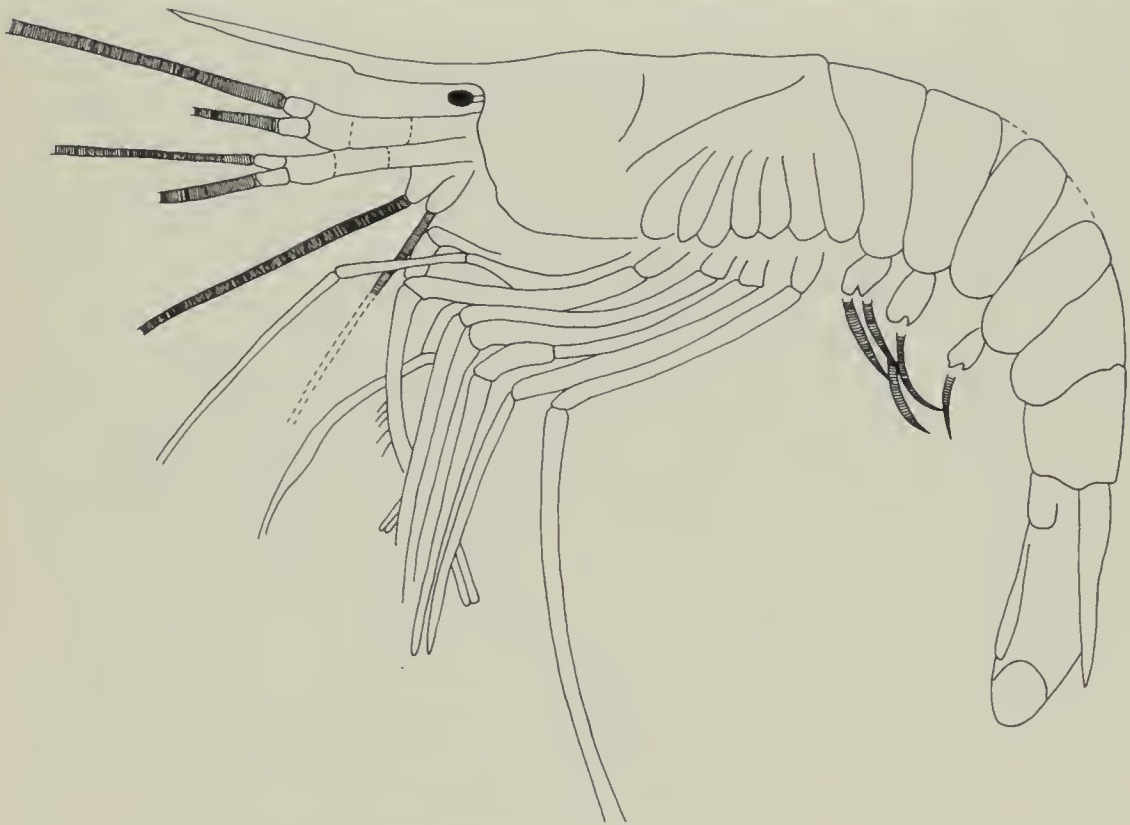


Fig. 19 — *Aeger robustus* n. sp.; n. cat. MSNM/i8756 photo and reconstruction ($\times 1,4$).



Fig. 20 — *Aeger robustus* n. sp.; n. cat. MSNM/i8758 photo and reconstruction ($\times 1$).

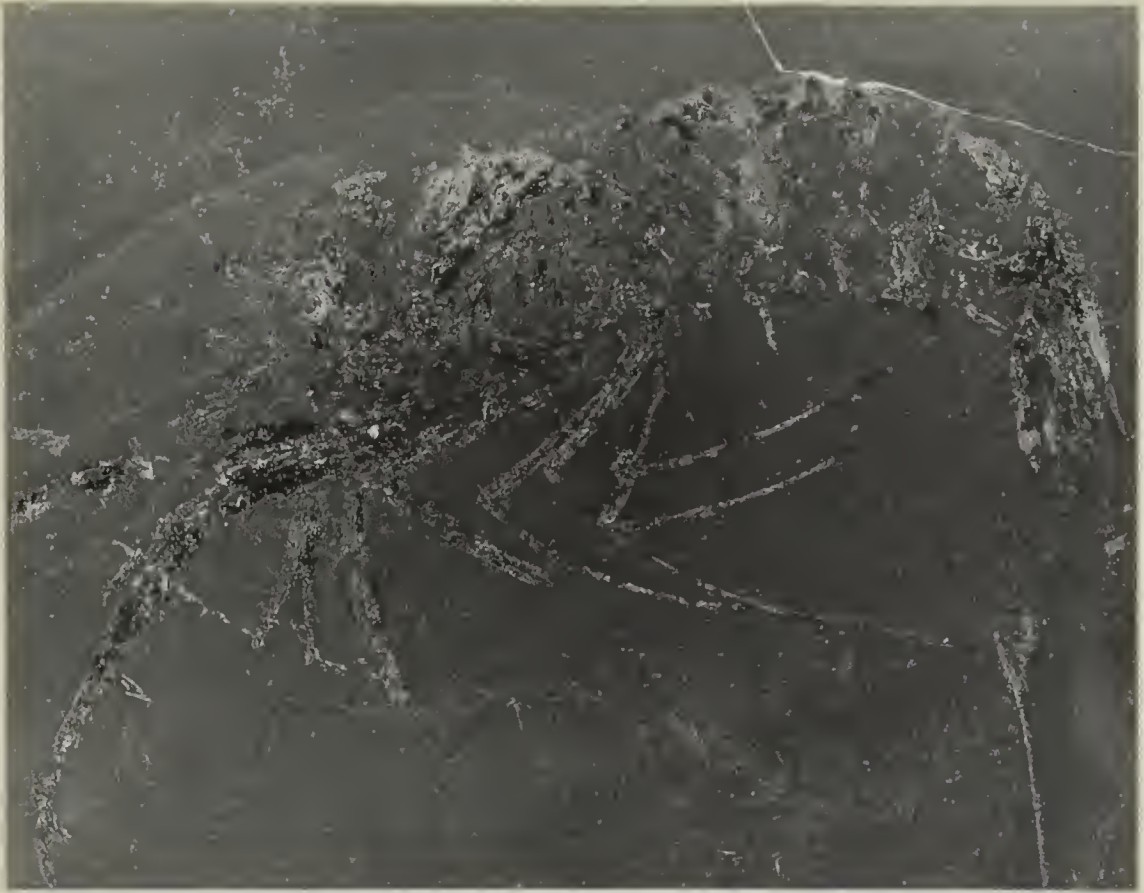


Fig. 21 — *Aeger robustus* n. sp.; holotype, n. cat. MSNM/i8759 photo and reconstruction (nat. size).

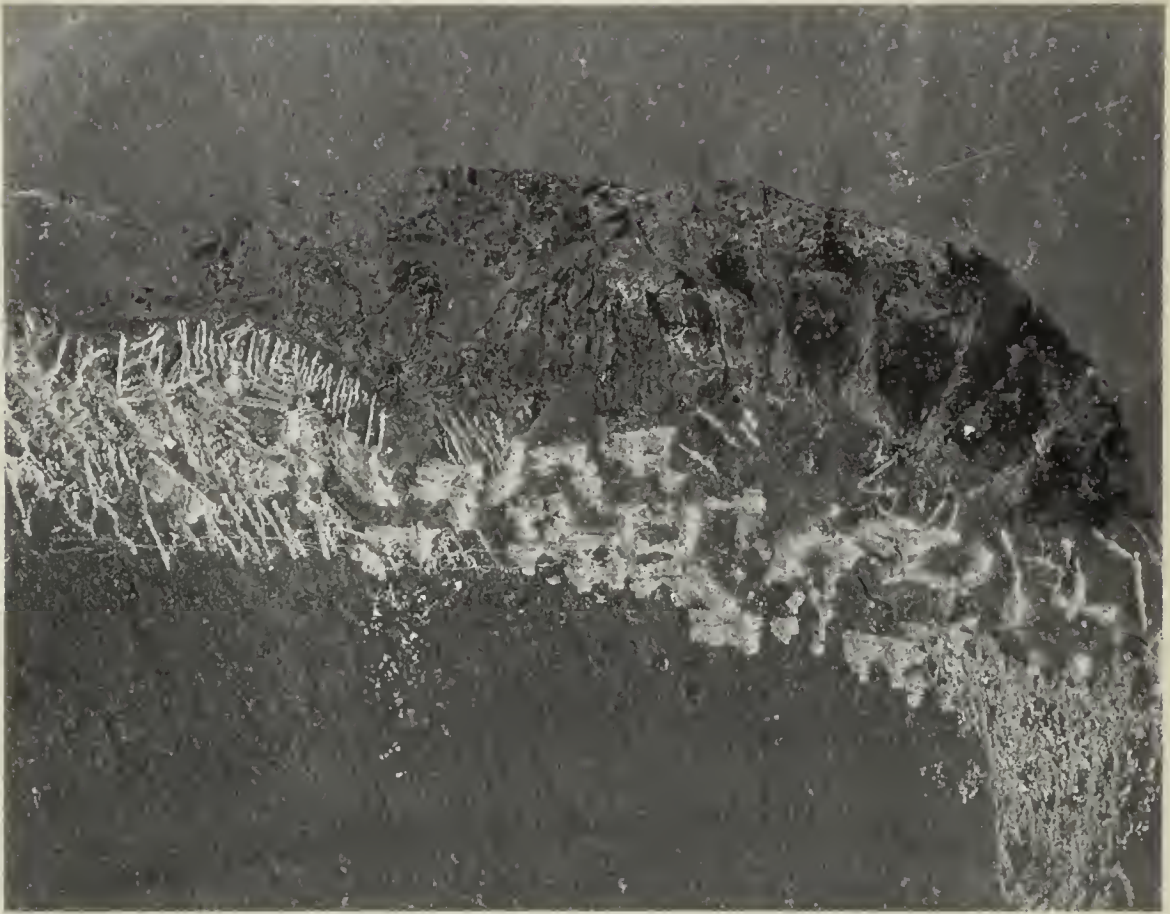


Fig. 22 — *Aeger rostrospinatus* n. sp.; holotype, n. cat. MSNM/i8768 photo and reconstruction ($\times 1,7$).

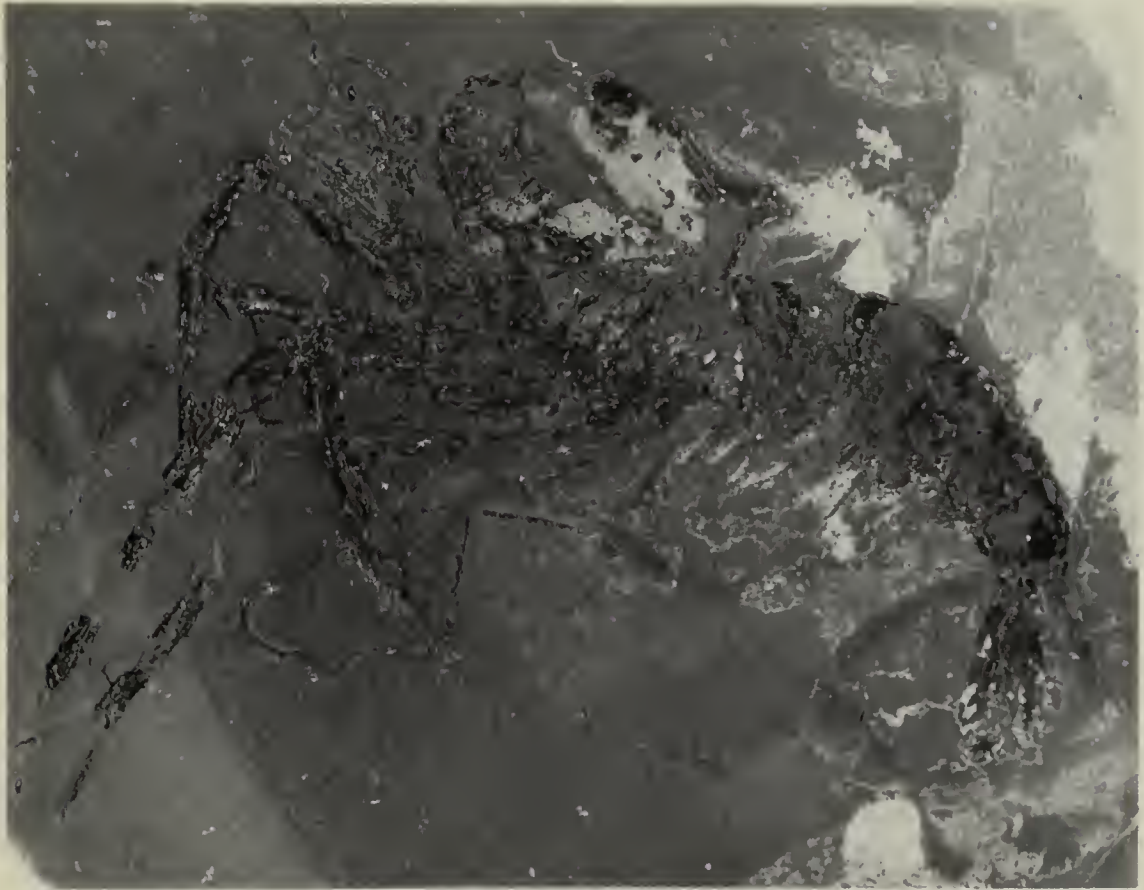


Fig. 23 — *Aeger macropus* n. sp.; holotype, n. cat. MSNM/i8770 photo and reconstruction ($\times 0,7$).



Fig. 24 — *Aeger elongatus* n. sp.; holotype, n. cat. MSNM/i8772 photo and reconstruction (nat. size).